

**Plan Check Requirements for:
TOXIC GAS ORDINANCE
INTERIOR USE & STORAGE/EXTERIOR USE
(Update-- 5/99)**

The Fire and Environmental Protection Division of the Mountain View Fire Department (650-903-6378) will review your submitted plans using this plan check guideline.

Enter below the page number of your submitted plans where the item asked for is described and highlight the item in your plans. Include brochures, manufacturer's cut sheets, and calculations with the plans when requested.

If all the required information asked for is included in your plans or attachments, they can be reviewed and approved by the Fire and Environmental Protection Division as quickly as five working days.

Facility Name: _____ **Address:** _____

Architect Name: _____ **Phone:** _____ **PC#:** _____ **Date:** _____

GENERAL

Ø If storage/use of the toxic gas(es) are inside a building, the gases must be within a "control area"¹. A maximum of 4 "control areas" are allowed inside a building (MVCC 24.103). *In the plans, outline the perimeter of each control area and indicate whether the perimeter walls are made of 1-hour construction or are exterior walls.* Plan page number: _____. (For office use only: Are there a maximum of 4 control areas called out in the entire building? _____) .

Ø **TOXIC GAS INVENTORY LIST.** List all regulated toxic gases, regardless of size/quantity, in one control area (if more than one control area is to be installed or modified, a separate plan check guideline must be completed for each control area). Use the attached reference list to help complete the table below:

Control Area name designation/description: _____

	Toxic Gas	Number of Cylinders	X	Qty of Toxin Per Cyl. (lbs.)	=	Total Quantity of Toxin (lbs./Cu.Ft.)	CLASS	Cylinder/Port.Tank/ Stationary Tank
IDLH	PEL							
_____			X	_____	=	_____	_____	_____

_____			X	_____	=	_____	_____	_____

_____			X	_____	=	_____	_____	_____

¹ A "control area" is a space within a building formed by 1-hour fire construction walls, exterior walls, roof, or foundation of the building.

_____ X _____ = _____

_____ X _____ = _____

θ Flow-restricting or flow-limiting devices are required for all Class I materials, regardless of quantity (MVCC 24.305.b). *Attach manufacturer's cut sheets of the flow-limiting devices which specify the orifice size(s). Attach manufacturer's calculations for the maximum flow rate through each orifice.*

θ All control areas containing Class I materials are required to have automatic sprinkler systems. They shall be designed for ordinary hazard Group II with a minimum design area of 3,000 square feet (MVCC 24.05.b). Note: if all toxic gases are stored in gas cabinets, the gas cabinets may be sprinklered in lieu of the control area. *Indicate the type of sprinkler layout for this control area.* Plan page number: _____. (For office use only: Are any materials in these areas water-reactive which would require an alternative fire extinguishing system? _____).

Small quantities of toxic gases in a control area may be exempt from further requirements. *Complete the items below to determine if any toxic gases listed above are exempt:*

θ a) What is the total quantity of all materials from the TOXIC GAS INVENTORY LIST (Cu.Ft.): _____ .

If item (a) is less than or equal to 40 cubic feet, continue to item (b) below; otherwise, skip items (b) thru (d).

θ b) *Cross out all entries in the TOXIC GAS INVENTORY LIST where each individual cylinder will not exceed 1 pound of toxic gas and the total quantity of that gas in all cylinders will not exceed 2 pounds.* These are exempt from further requirements.

θ c) *Cross out all entries in the TOXIC GAS INVENTORY LIST where each individual cylinder will not exceed the Permissible Exposure Limit (PEL) and the total quantity of that gas in all cylinders will not exceed 2 pounds.* These are exempt from further requirements.

θ d) *If any remaining entry is less than or equal to 2 pounds, place the word "Min. T.Q." in the "CLASS" column of the list.*

FOR ALL MINIMUM THRESHOLD QUANTITY (MIN T.Q.), CLASS I, CLASS II, & CLASS III GASES, CONTINUE...

θ Security measures to limit access to each control area are required (MVCC 24.230). *Describe the security measures for the control area.* Plan page number: _____

θ A minimum of 2 Self Contained Breathing Apparatus (SCBAs) are required in areas where Class I or Corrosive toxic gases are present. The SCBAs should be located near the areas where these materials are present, but in locations that provide safety for those expected to don the apparatus (MVCC 24.235). *Show the location of the 2 SCBAs on the plans.* Plan page number: _____. (For office use only: Are these locations out of the range of immediate affect of a release? _____.)

θ Toxic gases in this control area which are incompatible with other hazardous materials (which, when mixed, chemically react to emit heat, pressure, degrade materials of construction, etc) must be separated either by 1-hour fire resistive construction or by gas cabinets (MVCC 24.240). *List any incompatible toxic gases and describe how they will be separated from one another.* Plan page number: _____.

θ Toxic gas cylinders shall be tested for leaks both during cylinder delivery and departure (MVCC 24.245). *Describe the leak test procedure in the plans.* Plan page number: _____.

θ An on-site emergency response team shall be designated to handle toxic gas releases (MVCC 24.257). *List the members of the emergency response team and their positions in the company in the plans.* Plan page number: _____.

θ All control areas are required to have automatic sprinkler systems. They shall be designed for ordinary hazard Group II with a minimum design area of 3,000 square feet (MVCC 24.275). Note: if all toxic gases are stored in gas cabinets, the gas cabinets may be sprinklered in lieu of the control area. *Indicate the type of sprinkler layout for this control area.* Plan page number: _____. (For office use only: Are any materials in these areas water-reactive which would require an alternative fire extinguishing system? _____).

θ All primary piping shall be helium leak tested to 1x10⁻⁹ cc/sec by a qualified third party not involved with the construction of the piping and control systems. (MVCC 24.835). *Indicate the name of the third-party contractor on the plans.* Plan page number: _____.

For CYLINDERS only:

θ a) Storage of cylinders shall be within: 1) ventilated gas cabinets; or 2) exhausted enclosures; or 3) ventilated separate gas storage rooms (MVCC 24.805). *Indicate on the plans which option(s) will be used.* Plan page number: _____.

b) If gas cabinets are used:

θ 1) *Attach manufacturer's cut sheets of the proposed cabinets to the plans.*

θ 2) The rooms or areas in which they are located shall have exhaust ventilation separate from the rest of the facility if the individual cabinets do not (MVCC 24.805.d). *Indicate on the plans whether the individual cabinets are exhausted or the room containing the cabinets is exhausted. Provide an exhaust diagram indicating that they are separate from the facility exhaust.* Plan page number: _____.

θ 3) The gas cabinets shall operate at negative pressure (MVCC 24.810). *Indicate this in the plans or manufacturer's cut sheets.* Plan or cut sheet page number: _____.

θ 4) The gas cabinets shall be provided with self-closing doors and access ports/windows (MVCC 24.810). *Indicate this on the plans or manufacturer's cut sheets.* Plan or cut sheet page number: _____.

θ 5) The gas cabinets shall draw an average velocity of 200 fpm of air across the port/window face and a minimum of 150 fpm velocity. (MVCC 24.810). *Indicate the average and minimum face velocity on the plans or manufacturer's cut sheets.* Plan or cut sheet page number: _____.

θ 6) The gas cabinets shall be constructed of 12-gauge steel, minimum (MVCC 24.810). *Indicate the steel thickness of the gas cabinets on the plans or manufacturer's cut sheets.* Plan or cut sheet page number: _____.

θ c) If exhausted enclosures are used:

1) Exhausted enclosures shall be either approved laboratory fume hoods or process equipment (MVCC 24.805). *Attach manufacturer's cut sheets and the UL or other listing for the fume hood or process equipment to the plans.*

θ d) *Provide manufacturer's calculations for the maximum flow rate from each cylinder orifice (including the reduced-flow orifice, if applicable).* Plan page number: _____.

θ e) Treatment systems are required which shall be designed to reduce the maximum discharge concentration of the gases at the point of discharge to the atmosphere to 1/2 IDLH, based on the maximum flow rate specified by the manufacturer (including the reduced-flow orifice, if applicable), or, if flow rates are not available,

based on either: 1) a 5-minute release for a non-liquefied gas or 2) a 30-minute release for a liquefied gas (MVCC 24.815 & 24.830). *Attach calculations using the maximum gas flow rates and treatment system flow rate (if dilution is used for treatment), to show that the final gas concentrations at the stack will be less than 1/2 IDLH.* Plan page number: _____ .

- θ f) If a treatment system other than dilution is used to meet the 1/2 IDLH calculation (scrubber, bum box, etc.), *attach calculations which describe the treatment system's efficiency %, based on the total amount of exhaust treated, packing material, air flow rate, etc.* Plan page number: _____ . *Attach manufacturer's cut sheets on the new or existing treatment system.*
- θ g) Reduced flow orifices and excess flow valves shall be permanently marked to indicate the maximum design flow rate with 1/4" letters in contrasting colors. (MVCC 24.830.b). *Indicate that this will be done on the plans.* Plan page number: _____ .

For STATIONARY TANKS only:

- θ a) Stationary tanks shall be stored within a separate ventilated room without other occupancy or use (MVCC 24.805). *Indicate the room location and provide a diagram showing the separate ventilation system.* Plan page number: _____ .
- θ b) *Provide manufacturer's calculations for the maximum flow rate from each valvelfitting. Include flow rates for those valves/fitings in direct contact with a liquefied gas.* Plan page number: _____ .
- θ c) Treatment systems shall be designed to reduce the maximum discharge concentration of the gases at the point of discharge to the atmosphere to 1/2 IDLH, based on the maximum flow rate specified by the manufacturer (MVCC 24.815). *Attach calculations using the maximum gas flow rates and treatment system flow rate (if dilution is used for treatment), to show that the final gas concentrations at the stack will be less than 1/2 IDLH.* Plan page number: _____ .
- θ d) If a treatment system other than dilution is used to meet the 1/2 IDLH calculation (scrubber, bum box, etc.), *attach calculations which describe the treatment system's efficiency %, based on the total amount of exhaust treated, packing material, airflow rate, etc.* Plan page number: _____ . *Attach manufacturer's cut sheet on the new or existing treatment system.*
- θ e) Stationary tanks shall be seismically braced. (MVCC 24.225). *Show this on the plans.* Plan page number: _____ .

For PORTABLE TANKS only:

- θ a) Portable tanks shall be stored within a separate ventilated room without other occupancy or use (MVCC 24.805). *Indicate the room location and provide a diagram showing the separate ventilation system.* Plan page number: _____ .
- θ b) *Provide manufacturer's calculations for the maximum flow rate from each orifice (including the reduced-flow orifice, if applicable).* Plan page number: _____ .
- θ c) Treatment systems are required which shall be designed to reduce the maximum discharge concentration of the gases at the point of discharge to the atmosphere to 1/2 IDLH, based on the maximum flow rate specified by the manufacturer (including the reduced-flow orifice, if applicable), or, if flow rates are not available, based on either: 1) a 40-minute release for a non-liquefied gas or 2) a 240-minute release for a liquefied gas (MVCC 24.815 & 24.830). *Attach calculations using the maximum gas flow rates and treatment system flow rate (if dilution is used for treatment), to show that the final gas concentrations at the stack will be less than 1/2 IDLH.* Plan page number: _____ .
- θ d) If a treatment system other than dilution is used to meet the 1/2 IDLH calculation (scrubber, bum box, etc.), *attach calculations which describe the treatment system's efficiency %, based on the total amount of exhaust*

treated, packing material, air flow rate, etc. Plan page number: _____ . Attach manufacturer's cut sheets on the new or existing treatment system.

- θ e) Reduced flow orifices and excess flow valves shall be permanently marked to indicate the maximum design flow rate with 1/4" letters in contrasting colors. (MVCC 24.830.b). *Indicate that this will be done on the plans.* Plan page number: _____ .

FOR CLASS I, II, AND III MATERIALS, CONTINUE...

- θ *Provide a list of materials of construction for piping, valves, and related fittings.* Plan page number: _____ .
(For office use only: Are these compatible with the materials they will contain?) (MVCC 24.705.A) _____ .

- θ For Stationary Tanks, an NFPA 704M placard shall be affixed to them for identification (MVCC 24.710.a). *Indicate the NFPA designation on the plans.* Plan page number: _____ .

- θ "No Smoking" signs shall be provided within inside storage/use areas and within 25' of outdoor use areas (MVCC 24.710.b). *Indicate this on the plans.* Plan page number: _____ .

- θ Dedicated and separate inert gas purge systems shall be used for each toxic gas (MVCC 24.715). *Indicate the specific inert gas used with each toxic gas on the plans.* Plan page number: _____ .

- θ Dedicated and separate inert gas purge cylinders shall be stored inside the associated toxic gas cabinet if the piping is pressurized (MVCC 24.715). *Show the location of the purge cylinders in the plans.* Plan page number: _____ .
(For office use only: If a purge gas is used to purge more than one toxic gas cylinder, are all these toxic gases compatible?) _____ .

FOR CLASS I AND II MATERIALS, CONTINUE....

- θ For pressurized piping, all piping connections shall be welded OR the piping itself enclosed within an exhausted enclosure (MVCC 24.605). *Indicate which option will be used on the plans.* Plan page number: _____ .

- θ Fail-safe-to-close shut-offs which are activated manually shall be located at both point of use areas AND near the gas sources (MVCC 24.610). *Attach manufacturer's cut sheets on the manually-activated shut-offs. Indicate the locations of the shut-offs on the plans.* Plan page number: _____ .

Emergency power shall be provided for:

- θ a) Exhaust ventilation (MVCC 24.615.a). *Show the electrical schematics of how the emergency power will activate the exhaust ventilation.* Plan page number: _____ .
- θ b) Treatment system (MVCC 24.615.a). *Show the electrical schematics of how the emergency power will activate the treatment system.* Plan page number: _____ .
- θ c) Gas detection system (MVCC 24.615.b). *Show the electrical schematics of how the emergency power will activate the gas detection system.* Plan page number: _____ .
- θ d) Emergency alarms (MVCC 24.615.c). *Show the electrical schematics of how the emergency power will activate the emergency alarms.* Plan page number: _____ .

- θ Excess flow valves, flow sensors, or other flow meters of fail-safe-to-close-design shall be installed in each product pipe, and shall be marked to indicate maximum design flow rate (MVCC 24.620). *Attach manufacturer's cut sheets of these excess flow controls. Attach worksheets justifying the proper sizing of each excess flow control (based on tool flow demand). Indicate on the plans that the excess flow controls will be permanently marked with the maximum*

flow rate. Plan page number: _____ .

θ A continuous gas detection system which will alarm at the PEL level (in occupiable areas) and 1/2 IDLH level (in unoccupiable areas) is required. The detection system shall initiate a local audible and visual alarm. Gas detection sensors shall be located at the toxic gas source and at the tool (minimum). (MVCC 24.625). *Attach manufacturer's cut sheets on the continuous gas detection system. Show the electrical schematics of how the alarm signal will be transferred to a constantly staffed remote location.* Plan page number: _____. *Show the location of the audible. And visual alarm units.* Plan page number: _____. *Show the location of all sensors.* Plan page number: _____.

θ A continuous exhaust flow detection system which will alarm when the ventilation flow rate drops below the lowest rate needed to meet the 1/2 IDLH concentrations at the stack is required. The detection system shall initiate a local audible and visual alarm which provides warning both inside and outside of the interior storage/use area. (MVCC 24.630) *Show the location of the exhaust flow detection system (including locations of all dampers if applicable).* Plan page number: _____. *Attach manufacturer's cut sheets on the flow sensor and alarm.*

θ All cylinders and tanks shall be equipped with seismic shut-off valves which shut off product flow during a seismic event. (MVCC 24.635). *Attach manufacturer's cut sheets on the seismic valve. Show the location of the seismic alarm control panel.* Plan page number: _____ .

θ For pressurized piping containing corrosives, the piping construction materials shall be completely inert OR the piping itself shall be secondarily contained (MVCC 24.640). *Indicate on the plans which option will be used.* Plan page number: _____ .

θ For vacuum piping containing corrosives, a vacuum/pressure gauge and fail-safe-to-close valve on the high pressure side of the piping which is activated by a loss of vacuum shall be supplied. (MVCC 24.640). *Attach cut sheets of the gauge and valve. Show the locations of the gauge and valve on the plans.* Plan page number: _____. *Show the electrical schematics of how valve closure will initiate an alarm.* Plan page number: _____ .

θ *Outline the route used to transport the toxic gases into the building and indicate whether this is an exit corridor or not.* Plan page number: _____. If this route is an exit corridor, telephones, manual alarm stations, or other signaling devices shall be located at 150' intervals throughout the exit corridors and at each doorway of the corridor along the transportation route. (MVCC 24.645). *Indicate the type and location of the signaling devices on the plans.* Plan page number: _____. *Show the electrical schematics of how their signals will be relayed to a remote station.* Plan page number: _____ .

θ If a treatment system other than dilution is used to meet the 1/2 IDLH calculation (scrubber, burn box, etc.), a detection/monitoring system which will alarm when the treatment system fails or is taken out of service is required. (MVCC 24.815). *Attach manufacturer's cut sheets on the detection system which will monitor the treatment system function. Show the electrical schematics of how the alarm signal will be transferred to a constantly staffed remote location.* Plan page number: _____ .

FOR CLASS I MATERIALS, CONTINUE....

θ Pressurized piping shall be secondarily contained with compatible materials. The secondary containment shall be capable of directing a sudden release into an approved discharge treatment system. (MVCC 24.505). *Attach cut sheets on the materials of construction for the secondary containment piping.* (For office use only): Is this material compatible with the gas contained? _____

θ Vacuum piping shall be equipped with a vacuum/pressure gauge and fail-safe-to-close valve on the high pressure side of the piping which is activated by a loss of vacuum. (MVCC 24.505). *Attach cut sheets of the gauge and valve to the plans.*

Automatic shutdown of the gas shall be activated upon:

- 0 a) A gas detection alarm at PEL (in occupied areas) or 1/2 IDLH (in unoccupied areas). (MVCC 24.510). *Show the electrical schematics of how the gas detection alarm signal will activate the automatic shutoff valve on the cylinder.* Plan page number: _____.
- 0 b) Manual activation of emergency shutoff valves from remote locations. (MVCC 24.510). *Show the electrical schematics of how the manual shutoff valves will activate the automatic shutoff valve on the cylinder.* Plan page number: _____.
- 0 c) Failure of emergency power. (MVCC 24.510). *Show the electrical schematics of how loss of primary power will activate the automatic shutoff valve on the cylinder.* Plan page number: _____.
- 0 d) Seismic activation. (MVCC 24.510). *Show the electrical schematics of how the seismic sensor will activate the automatic shutoff valve on the cylinder.* Plan page number: _____.
- 0 e) Activation of a fire alarm. (MVCC 24.510). *Show the electrical schematics of how fire alarm activation will activate the automatic shutoff valve on the cylinder.* Plan page number: _____.
- 0 f) Failure of required exhaust flow ventilation. (MVCC 24.510). *Show the electrical schematics of how exhaust flow alarm activation will activate the automatic shutoff valve on the cylinder.* Plan page number: _____.

The following signals shall be directed to a constantly-attended remote station:

- 0 a) Automatic shut-off signal. (MVCC 24.515). *Show the electrical schematics of how automatic shutoff signals are routed to the constantly attended remote station.* Plan page number: _____.
- 0 b) Emergency power source signal. (MVCC 24.515). *Show the electrical schematics of how emergency power signals are routed to the constantly attended remote station.* Plan page number: _____.
- 0 c) Seismic activation signal. (MVCC 24.515). *Show the electrical schematics of how seismic activation signals are routed to the constantly attended remote station.* Plan page number: _____.
- 0 d) Manual shut-off signal. (MVCC 24.515). *Show the electrical schematics of how activation of manual shutoff valves are routed to the constantly attended remote station.* Plan page number: _____.
- 0 e) Exhaust ventilation monitoring signal. (MVCC 24.515). *Show the electrical schematics of how the exhaust ventilation signal is routed to the constantly attended remote station.* Plan page number: _____.